

Application Serial No. 10/578,292
Reply to Office Action of October 10, 2007

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Docket: CU-4797
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Amendments to the Claims

The listing of claims presented below replaces all prior versions, and listings, of claims in the application.

Listing of claims:

1-9. (cancelled)

10. (previously presented) A liquid crystal display apparatus comprising at least two sheets of transparent substrates, a liquid crystal layer sealed between the two sheets of transparent substrates, and a plurality of columnar spacers formed between the two sheets of transparent substrates for keeping a gap between the two sheets of transparent substrates at a specified gap,

wherein a displacement amount between an 80 mN to 400 mN load is in a range of 0.1 mm to 0.8 mm, and a displacement amount between a 600 mN to 950 mN load is in a range of 0.05 mm to 0.5 mm at a time of applying a load by a measurement method in a direction so as to reduce the gap between the two sheets of transparent substrates to a display area of the two sheets of transparent substrates;

wherein, by the measurement method, a deformation amount against the load is measured by applying the load in a vertical direction to a transparent substrate surface with an indenter having a 2 mm ϕ plane by a 2.22 mN/sec applied load contacted with either of the transparent substrate side under a 23°C condition.

11. (Currently amended) A liquid crystal display apparatus comprising at least two sheets of transparent substrates, a liquid crystal layer sealed between the two sheets of transparent substrates, and a plurality of columnar spacers formed between the two sheets of transparent substrates for keeping a gap between the two sheets of transparent substrates at a specified gap,

wherein with a premise that a displacement amount between an 80 mN to 400 mN load is 100, a displacement amount between a 600 mN to 950 mN load is in a range of 30 to 200 at a time of applying a load by a measurement method in a direction so as to reduce the gap between the two sheets of transparent substrates to a display area of the two sheets of transparent substrates;

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wherein, by the measurement method, a deformation amount against the load is measured by applying the load in a vertical direction to a transparent substrate surface with an indenter having a 2 [[mmf]] mm plane by a 2.22 mN/sec applied load contacted with either of the transparent substrate side under a 23°C condition.

12. (previously presented) The liquid crystal display apparatus according to claim 10, wherein the plurality of columnar spacers formed so as to be distributed homogenously in the display area are at least two kinds of columnar spacers having different heights.

13. (previously presented) The liquid crystal display apparatus according to claim 11, wherein the plurality of columnar spacers formed so as to be distributed homogenously in the display area are at least two kinds of columnar spacers having different heights.

14. (previously presented) The liquid crystal display apparatus according to claim 12, wherein the at least two kinds of the columnar spacers having different heights are formed with one kind of material such that the height difference as the columnar spacers can be provided in accordance with a presence or an absence of a pedestal or by a height difference of the pedestal.

15. (previously presented) The liquid crystal display apparatus according to claim 13, wherein the at least two kinds of the columnar spacers having different heights are formed with one kind of material such that the height difference as the columnar spacers can be provided in accordance with a presence or an absence of a pedestal or by a height difference of the pedestal.

16. (previously presented) The liquid crystal display apparatus according to claim 14, wherein the pedestal is formed of at least one kind of layer selected from a group consisting of a colored layer, a light shielding layer and an over coat layer.

17. (previously presented) The liquid crystal display apparatus according to claim 15, wherein the pedestal is formed of at least one kind of layer selected from a group

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consisting of a colored layer, a light shielding layer and an over coat layer.

18. (previously presented) The liquid crystal display apparatus according to claim 12, wherein the at least two kinds of the columnar spacers having different heights are formed with at least two kinds of materials having different hardness such that a lower hardness material is used for a higher columnar space.

19. (previously presented) The liquid crystal display apparatus according to claim 13, wherein the at least two kinds of the columnar spacers having different heights are formed with at least two kinds of materials having different hardness such that a lower hardness material is used for a higher columnar space.

20. (previously presented) The liquid crystal display apparatus according to claim 12, wherein the at least two kinds of the columnar spacers having different heights have at least two kinds of shapes with different upper bottom surface areas such that a higher columnar space is formed so as to have a smaller upper bottom surface area.

21. (previously presented) The liquid crystal display apparatus according to claim 13, wherein the at least two kinds of the columnar spacers having different heights have at least two kinds of shapes with different upper bottom surface areas such that a higher columnar space is formed so as to have a smaller upper bottom surface area.

22. (previously presented) The liquid crystal display apparatus according to claim 12, wherein a height difference between a highest columnar space and a lowest columnar space of the at least two kinds of the columnar spacers having different heights is in a range of 0.02 mm 0.5 mm.

23. (previously presented) The liquid crystal display apparatus according to claim 13, wherein a height difference between a highest columnar space and a lowest columnar space of the at least two kinds of the columnar spacers having different heights is in a range of 0.02 mm 0.5 mm.

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24. (previously presented) The liquid crystal display apparatus according to claim 10, wherein the plurality of columnar spacers formed in the display area is provided by laminating two kinds of materials having a same height and a different hardness respectively.

25. (previously presented) The liquid crystal display apparatus according to claim 11, wherein the plurality of columnar spacers formed in the display area is provided by laminating two kinds of materials having a same height and a different hardness respectively.